(Acta Anaesth. Belg., 2008, 59, 47-49)

ProSeal laryngeal mask airway for cardiac surgery after airway rescue

A. van Zundert (*) and J. Brimacombe (**)

Abstract : We present the case of the successful use of a ProSeal™ laryngeal mask airway in a severe obese 41-year-old women with a difficult airway, scheduled to undergo cardiac surgery (off-pump coronary artery bypass). Two intubation attempts failed and face mask ventilation became impossible with rapidly falling peripheral oxygen saturation. A ProSeal™ laryngeal airway was railroaded over a tracheal tube guide, a gastric tube was inserted along the drain tube and the patient underwent positive pressure ventilation, resulting in normal gas exchange and an oropharyngeal leak pressure > 40 cm H_20. The decision was taken to proceed with the ProSeal™ as the airway during the surgical intervention. Surgery was uneventful and the ProSeal™ was removed on the ICU three hours later. This case reports illustrates the successful use of a guided insertion of the ProSeal™ laryngeal mask for airway rescue in cardiac surgery.

Key words : Anaesthesia ; intubation ; complication ; laryngeal mask ; cardiac surgery.

Introduction

The use of the classic laryngeal mask airway for cardiac surgery has been reported by several groups (1) ; however, it is not ideal since high airway pressure ventilation may be required and patients are frequently at risk of aspiration. The ProSeal™ laryngeal mask airway (ProSeal LMA™, The Laryngeal Mask Company, Ltd, Mahe Seychelles) is a laryngeal mask device which provides a better seal (2-4) and probably better protection against aspiration, as it incorporated a drainage tube (5). We report the use of the ProSeal LMA™ for cardiac surgery in a patient with a difficult airway, who had to undergo an off-pump coronary artery bypass intervention.

Case

A 41-year old grossly obese female (height 167 cm, weight 116 kg, BMI 42 kg/m^2) presented for coronary artery bypass grafting for persistent unstable angina one month after her fourth myocardial infarction. Her other past medical history included hypertension, hyperlipidaemia and deep venous thrombosis. She had undergone two percutaneous transluminal coronary angioplasties with stents under sedation and an ovarian cystectomy under general anaesthesia. Airway examination revealed that she was a potentially difficult airway with a large head (63 cm circumference), short thick neck (61 cm circumference), macroglossia, Mallampati grade IV, but with normal interincisor (3.4 cm) and thyromental distances (6.6 cm), with no overbite. There was no information available about her previous anaesthetic. The patient refused awake intubation. She had no symptoms of gastro-oesophageal reflux. The echocardiograph showed moderate to good ventricular function.

The airway management plan was to perform laryngoscope-guided tracheal intubation and to use a ProSeal LMA™ for airway rescue if intubation failed after two attempts. Routine cardiac surgery monitoring was applied including a 5-lead ECG, and arterial and central venous pressures. The patient was pre-oxygenated for four minutes. Induction was with fentanyl 0.5 µg.kg^{-1} and etomidate 0.35 mg.kg^{-1}. Face mask ventilation was feasible with a Guedel airway and rocuronium 0.5 mg.kg^{-1} was given. At laryngoscopy, the epiglottis/glottis/hypopharynx could not be seen (Cormack Lehane grade IV). The first attempt at intubation

André A. J. van Zundert, M.D., Ph.D., F.R.C.A. ; Joseph Brimacombe, M.D., M.B., Ch.B., F.R.C.A.
(*) Professor of Anesthesiology, Department of Anesthesiology, Intensive Care and Pain Therapy, Catharina Hospital, Brabant Medical School, Eindhoven, The Netherlands & University Ghent Hospital, Ghent, Belgium.
(**) Professor of Anesthesiology, Department of Anaesthesia and Intensive Care, James Cook University, Cairns, Base Hospital, Cairns, Australia.
Correspondence address : Prof. dr. André van Zundert, Professor of Anesthesiology, Department of Anesthesiology, Intensive Care and Pain Therapy, Catharina Hospital, Brabant Medical School, Michelangelolaan 2, 5623 EJ Eindhoven, The Netherlands. Tel. : + 31 40 2399 111. Fax : + 31 40 2463 978. E-mail : zundert@iae.nl

failed due to oesophageal placement of the tracheal tube. Face mask ventilation prior to the second attempt was more difficult and the second attempt at intubation failed due to oesophageal placement of a tracheal tube guide. Face mask ventilation after the second attempt was impossible with the peripheral oxygen saturation rapidly falling to 50%. The tracheal tube guide was reinserted into the oesophagus under laryngoscope guidance and a ProSeal LMA™ size 5 railroaded into position along the drain tube (6). The cuff was inflated with air to an intra-cuff pressure of 60 cm H_2O. Ventilation was easy with tidal volumes greater than 500 ml and a normal capnographic wave was obtained. The tracheal tube guide was removed. There was no air leak up the drain tube during ventilation and the mid-portion of the bite block was between the teeth. A gastric tube was easily inserted along the drain tube. Oropharyngeal leak pressure was > 40 cm H_2O. Anaesthesia was maintained with propofol 5 $mg.kg^{-1}.hr^{-1}$ and alfentanyl 70 $\mu g.kg^{-1}.hr^{-1}$ and sevoflurane 0.2-1%. The patient underwent positive pressure ventilation with tidal volumes of 600 ml, peak airway pressures of 25 cm H_2O, an inspiratory :expiratory ratio of 1:1 and a frequency of 16 min^{-1}. A decision was made to use the ProSeal LMA™ for the procedure, as gas exchange was normal and the airway was protected. Furthermore, waking the patient or exchanging the ProSeal LMA™ for a tracheal tube was considered more hazardous.

The off-pump coronary artery bypass surgery lasted 80 minutes and was uneventful with no evidence of cardiac ischaemia. Residual neuromuscular blockade was reversed with neostigmine and atropine. A total of 140 ml gastric fluid was suctioned from the stomach. The patient was transferred to the high dependency unit where she breathed spontaneously on 50% oxygen for two hours. The ProSeal LMA™ was removed uneventfully when the arterial blood gases were normal and was able to respond to commands. The chest drain was removed four days after surgery. There was no evidence of aspiration. The patient was discharged home six days after surgery. There were no further sequelae.

Discussion

Management of a difficult airway is challenging, and severe obesity adds to these difficulties. Cardiac surgery normally is performed using an endotracheal tube and positive pressure ventilation. Many anesthesiologists would object using a laryngeal mask in coronary artery bypass grafting although the stress response to tracheal intubation in patients undergoing coronary artery surgery is less with the laryngeal mask airway (7). Recently reports on successful prolonged use of the ProSeal LMA™ in postoperative mechanically ventilated patients on the ICU, was demonstrated (8-9).

It is our normal practice too to use an endotracheal tube in cardiac surgery, and it is certainly not our intention to encourage the routinary use of the ProSeal LMA™ in cardiac surgery but as a ProSeal LMA™ was readily available in the room, while the difficult intubation trolley was not, we inserted the laryngeal mask as an excellent airway 'rescue' device to buy some time for other options. We preferred the ProSeal LMA™ above a classic laryngeal mask for its better features (high seal cuff, gastric access). As subsequently the airway was satisfactory, with a good laryngeal seal, and given the fact that a short off-pump cardiac intervention was planned, we decided to proceed with the ProSeal LMA™. However, necessary steps were taken to proceed to a definitive airway if such need would arise. The ProSeal LMA™ could even provide a suitable airway for percutaneous tracheotomy if this was required. It is obvious that other options (10) in similar situations also can provide an effective airway (e.g. the intubating laryngeal mask, fibreoptic intubation) and that the lesson to be learned is that the difficult intubation trolley should always be available in the room whenever there is a patient with a possible difficult airway.

Conclusion

This case illustrates the successful guided insertion of the ProSeal LMA™ as an airway rescue for cardiac surgery and postoperative respiratory support.

References

1. Brimacombe J., *Surgery. Laryngeal Mask Anesthesia. Principles and Practice*. London : WB Saunders, 411-445, 2005.
2. Brain A. I. J., Verghese C., Strube P. J., *The LMA 'ProSeal' - a laryngeal mask with an oesophageal vent*, Br. J. Anaesth., **84**, 650-654, 2000.
3. Brimacombe J., Keller C., *The ProSeal laryngeal mask airway. A randomized, crossover study with the standard laryngeal mask airway in paralyzed, anesthetized patients*, Anesthesiology, **93**, 104-109, 2000.
4. Brimacombe J., Keller C., Fullekrug B., Agrò F., Rosenblatt W., Dierdorf S. F., Garcia de Lucas E.,

Capdevilla X., Brimacombe N., *A multicenter study comparing the ProSeal with the Classic laryngeal mask airway in anesthetized, nonparalyzed patients*, ANESTHESIOLOGY, **96**, 289-295, 2002.

5. Keller C., Brimacombe J., Kleinsasser A., Loeckinger A., *Does the ProSeal laryngeal mask airway prevent aspiration of regurgitated fluid ?*, ANESTH. ANALG., **91**, 1017-1020, 2000.
6. Brimacombe J., Keller C., Judd D. V., *Gum elastic bougie-guided insertion of the ProSeal™ laryngeal mask airway is superior to the digital and introducer tool techniques*, ANESTHESIOLOGY, **100**, 25-29, 2004.
7. Kahl M., Eberhart L. H. J., Behnke H., Sänger S., Schwarz U., Vogt S., Moosdorf R., Wulf H., Geldner G., *Stress response to tracheal intubation in patients undergoing coronary artery surgery : Direct laryngoscopy versus an intubating laryngeal mask airway*, J. CARDIOTHORAC. VASC. ANESTH., **18**, 275-280, 2004.
8. Di Iorio C., Cafiero T., Varriale P., Spatola R., Manelli R., Di Minno R. M., *Prolonged use of the ProSeal laryngeal mask in ICU*, EUR. J. ANESTHESIOL., **23**, 979-980, 2006.
9. Laver S., Craft T. M., Cook T. M., *Use of the ProSeal LMA in the ICU to facilitate weaning from controlled ventilation in patients with severe two episodic bronchospasm*, EUR. J. ANESTHESIOL., **23**, 980-981, 2006.
10. Bennett S. R., Grace D., Griffin S. C., *Cardiovascular changes with the laryngeal mask airway in cardiac anaesthesia*, BR. J. ANAESTH., **92**, 885-887, 2004.